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14. ABSTRACT The degree to which Joint Task Force (JTF) Commanders are responsible for full spectrum operations encompasses a greater need for a standing Joint Engineer Force Headquarters which is capable of providing command and control of engineer forces for greater operational effectiveness from initial entry operations to nation building. This paper is intended to expound on Engineer Transformation and specifically discuss the idea of establishing a standing Joint Engineer Force Headquarters with the ability to better provide the unique capabilities that engineers from all services posses.

The Joint Engineer Headquarters concept is a step to show that a more responsive and deployable C2 structure is needed. Based on current conditions in the world the engineers in the various services will need to start thinking more joint and how the engineer force can better serve the JTF Commander. It will be a struggle similar to the Goldwater – Nicholas Act was. Once the engineer regiment decides to do this, its capability will far exceed its current operating structure.

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JOINT FORCES STAFF COLLEGE
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Developing a Joint Engineer Headquarters for the JTF Commander.

By

Major John P. Lloyd
U.S. Army

A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

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5 April 2007

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About the Author

Major John P. Lloyd received his commission from Cameron University in 1995 where he earned a B.S. in Biology. He attended the Engineer Officer Basic and Advanced Courses at Fort Leonard Wood, MO. He has served in numerous engineer assignments to include assignments with the 14th Combat Engineer Battalion, Fort Lewis, WA, the 20th Engineer Brigade, Fort Bragg, NC, and as the Deputy Maneuver Support Trainer, Fort Irwin, CA. His deployments include Desert Shield/Storm with the 299th Combat Engineer Battalion, and Operation Enduring Freedom as the Chief of Topographic Planning for CFLCC, Kuwait. He commanded the 175th Topographic Engineer Company at Fort Bragg, NC from May 2002 to October 2003. As the Deputy maneuver Support Trainer at Fort Irwin, CA, he began the initial planning and structuring of the Improvised Explosive Device Center of Excellence. Major Lloyd is currently a student at the Joint Advanced Warfighting School and will graduate in June 2007.

ABSTRACT

DEVELOPING A JOINT ENGINEER HEADQUARTERS FOR THE JTF COMMANDER, By Major John Lloyd, US Army, 61 pages.

The degree to which Joint Task Force (JTF) Commanders are responsible for full spectrum operations encompasses a greater need for a standing Joint Engineer Force Headquarters which is capable of providing command and control of engineer forces for greater operational effectiveness from initial entry operations to nation building. This paper is intended to expound on Engineer Transformation and specifically discuss the idea of establishing a standing Joint Engineer Force Headquarters with the ability to better provide the unique capabilities that engineers from all services posses.

The Joint Engineer Headquarters concept is a step to show that a more responsive and deployable C2 structure is needed. Based on current conditions in the world the engineers in the various services will need to start thinking more joint and how the engineer force can better serve the JTF Commander. It will be a struggle similar to the Goldwater – Nicholas Act was. Once the engineer regiment decides to do this, its capability will far exceed its current operating structure.

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Introduction

This papers thesis discusses Engineer Transformation and specifically argues the process of establishing a Standing Joint Engineer Force Headquarters with resident capabilities that will enhance the Joint Force Commander command and control (C2) of all engineer forces within his Area of Responsibility (AOR). The degree to which Joint Task Force (JTF) Commanders are responsible for full spectrum operations encompasses a greater need for a standing Joint Engineer Force Headquarters which is capable of providing command and control of engineer forces for greater operational effectiveness from initial entry operations to nation building.

The JTF Engineer staff is not manned to handle all the requirements that the JTF Commander will be required to execute in a Theater of Operations. These staffs are usually manned to assist the JTF staff in developing plans and orders to execute various engineer missions. With this in mind the question must be raised as to who then provides the oversight of all the unique and complex missions that engineers are required to do. These missions range from assuring mobility in both open and complex urban terrain, gap crossings, and providing traditional engineer tasks in survivability, countermobility to geospatial engineering. Additionally, one of the most vital tasks is reconstruction, infrastructure repair and enhancement in Phase IV Operations.

Current Army transformation has furthered the need of a Joint Engineer Headquarters by making our engineer units more modular in nature. Army Engineer Brigades have been decreased to four units Army wide. While the idea of making our forces more modular to fill capability gaps has merit, it is questionable as to whether only four engineer brigades will be enough to provide all the command and control requirements needed in engineer operations to support a JTF Commander. Let's look at

this further considering our current deployments and requirements. With the four brigade example in the current Army force, one can be deployed in Afghanistan, one in Iraq, one in the United States prepared for disaster relief, and another prepared for either a wartime contingency operation or disaster relief efforts in the United States or worldwide.

At this point only Army Engineer Brigades have been used as the senior Joint Engineer Headquarters. This is mainly due to the fact that the other services typically use battalion level organizations as their highest engineer structure. However, the Naval Construction Force could use the Naval Construction Regiment (NCR) as another possibility for the Joint Engineer Headquarters. Their mission statement is to exercise administrative and operational control of two or more Naval Mobile Construction Battalions or other Naval Construction Force units operating in a specific geographic area or operating in support of a specific military operation.

The NCR would equally have to transform to a Joint Headquarters and restructure itself to support the full spectrum of engineer operations which support the JTF Commander. In doing so, the NCR could bring an added Headquarters with the addition of its two active and four reserve component regiments. This would increase the force pool of a Joint Engineer Headquarters to Command and Control multiple engineer units from all the services.

This example has historical reference when in 1998 hurricane Mitch hit Central America. All military engineers in Honduras were assigned to JTF-Bravo which had a small engineer staff in the J-7. JTF-Bravo asked that US Southern Command (SOUTHCOM) to either augment the engineer staff or provide a command and control unit for the engineer forces. From this request the Commander in Chief, Atlantic Fleet, tasked a Naval Construction Regiment (NCR) to perform the task. Another example is

the 30th Naval Construction Regiment (NCR) in Iraq that commanded and controlled Naval Mobile Construction Battalions, Marine Corps Engineer Battalions and Army Engineer Battalions, both combat and construction type units.

Although the appearance of engineer transformation appears to be headed in the right direction with more modular units, this paper will attempt to show that we need to improve our Engineer Command and Control Headquarters. The intent is to illustrate the increased capability and responsibility of the Joint Engineer Headquarters which will improve the C2 of engineer units for the JTF Commander. The formation of JTF Headquarters historically has not been easy, and the military will continue to struggle with their formation. The Engineer force must identify how they will support the JTF and leverage the capabilities of engineers across the services. The Joint Engineer Headquarters should not have to deal with the issue of bringing in augmentees or an unfamiliar team while trying to deploy at the same time. The staff must be in place ready to identify engineer modules which best support the JTF and contingency operation they are called upon to execute.

The modular transformation idea allows for much greater flexibility based on capabilities the JTF Commander requires. This further necessitates the Joint Engineer Headquarters to be an organization that is constant, has previously worked together, and is ready to provide command and control over engineer forces rather than simply an "ad hoc" organization.

Numerous papers and articles, as well as lessons learned, exists on many of the subjects presented in this paper. The intent is to bring together the lessons learned from those that are experiencing many of these current issues, and examine them alongside current engineer doctrine.

The paper is approached using the DOTMLPF (doctrine, organization, training, materiel, personnel, and facilities) organization. Chapter one identifies five criterions that were common threads in researching and looking at lessons learned of engineer operations during Iraqi Freedom and Enduring Freedom in Afghanistan. Chapter two will cover doctrine with focus on Joint Publication 3-34 as our basis for discussion. Chapters three and four will compare current organizations with a proposed organization. The proposed organization is based on the criteria for establishment, recommendations from the engineer field, as well as the many lessons learned from Operation Enduring Freedom, Operation Iraqi Freedom, and Natural disasters both in the United States and overseas. Chapter five examines the training of engineer leaders who fill the staff of the Joint Engineer Headquarters. It includes the current status of the engineer education system and the improvements being made to close the gap on understanding joint engineer capabilities. Chapter six looks at Materiel Solutions that are faced and how the headquarters can efficiently plan and provide support to other engineers from all services and the equipment they bring to the fight. The many capabilities that engineers have are the focus in Chapter seven, where the expectations of the JTF Commander are discussed. First the tasks that are most important must be identified. Chapter eight will explore how engineers and the Joint Engineer Headquarters support counterinsurgency for the JTF Commander. There is much speculation on what the next war will look like. The current lessons learned from Operation Enduring Freedom and Operation Iraqi Freedom will include a greater role for engineers in the counterinsurgency fight. Lessons learned from natural disasters, both in the United States and internationally, will be the focus in Chapter nine. The role of a Joint Engineer Headquarters will be to rapidly deploy with a

JTF and provide engineer support, assisting disaster victims in returning to their lives as quickly as possible.

Chapter 1

Criteria for the Establishment of a Joint Engineer Headquarters

There is currently no established doctrinal criterion for a Joint Engineer Headquarters. Therefore, five criterions were created as a method to develop a headquarters that can command and control numerous engineers from various services. The criterions defined below are: adaptability, interoperability, responsiveness, relevance, and network enabled. The significance of these criteria was based on the research of doctrine and lessons learned from various engineer operations throughout history, and were the consistent threads found that provided a successful headquarters.

Adaptability. The Joint Engineer HQ must be capable of adapting to a particular situation whether it is combat operations or stability and reconstruction operations. As engineer forces become more modular in nature, the Joint Engineer HQ must be adaptive enough to receive these forces and get them integrated into JTF operations. The HQ must be able to quickly understand the amount of personnel resources as well as the equipment required to support the JTF Commander. It is important that the force package determined by the JTF and Engineer HQ be able to provide the required capability for the mission set.

Interoperability. This criterion can be divided into specific details that the Joint Engineer HQ uses to operate with subordinate engineer units. It is primarily concerned with Standard Operating Procedures (SOPs) which include how equipment will be serviced and repaired. One of the interoperability standards is to receive units and prepare them to conduct engineer operations in support of a JTF commander. The Joint Engineer Headquarters must be prepared to train units prior to deployment and during Reception, Staging, On-ward movement, and Integration (RSOI) to meet theater or JTF

requirements. Equipment interoperability not only includes machinery, but also computer and radio systems to be able to communicate and gain situational awareness. Additionally, communication procedures will need to be established on how reporting will be executed both to and from subordinate units**.**

Responsiveness. In most cases the Joint Engineer Headquarters will not be able to receive training on engineer services prior to deployment. Responsiveness focuses on how quickly the headquarters can stand-up and begin the command and control requirements needed to become operationally effective in a contingency operation. While staffs may be able to stand-up quickly, this does not necessarily mean they are effective. Responsiveness is defined by how readily the staff can both be organized and operationally effective in some cases before the JTF staff is established.

Relevance. The Joint Engineer HQ must be able to be staffed and organized to quickly demonstrate its added value to the JTF, rather than just another bureaucratic headquarters. Its capabilities will be further discussed in this chapter as we outline the proposed structure and staff requirements of this headquarters.

Network Enabled. This criterion deals with the ability to receive and share information. The Joint Engineer Headquarters must be able to receive and analyze data, and provide information back to both subordinate and higher organizations. The critical component of the headquarters network centric is its ability to collect data and manage it in a database that can be shared with others. At least three of the required databases that must be managed will be examined: the Geospatial Database, the Host Nation Engineer Assets Database, and the IED database to help with both Assured Mobility and Counterinsurgency.

Chapter 2

Doctrine

Presently, no doctrine exists to form a Joint Engineer Headquarters, while much more has been written on forming a Joint Task Force. This chapter will try and focus on the formation of a JTF and see if the same doctrine can be applied to the Joint Engineer Headquarters. Ultimately the goal is to establish a headquarters that provides the JTF Commander with a synergistic engineer force.

Bringing the joint concept to the Engineer Headquarters does not imply adding another layer of bureaucracy with additional staff requirements, but allows the increased expertise in engineer functions needed by the JTF Commander. The Engineer Headquarters staff must be capable of operating on the Operational/Tactical nexus in a full spectrum contingency operation.

An example is the use of Army Combat Engineers and their significant capabilities that they bring to the operational environment. While these engineer organizations have great capability, one would argue that their ability to build roads, base camps, or airfields is limited. The Joint Engineer Headquarters staff would understand this and be able to apply the expertise to identify the best engineer force from any of the services to complete the task. This concept holds, as we will see in Chapter 4 on Organization, that more than joint positions in our headquarters are needed. More importantly, these positions need to be identified in our functional engineer cells where that expertise can be exploited to better serve the JTF Commander. The important theory here is that joint staffing should be seen as a method to bring critical expertise to our organization, and without it we will not be able to apply critical engineer capabilities in a timely manner to serve the JTF Commander, staff, and other forces under the JTF.

In joint operations, engineer operations support the development of the battlespace for maneuver, enhance strategic and operational movement, and provide infrastructure for force projection. The total engineer force of military active and reserve, civilian, contractor, host nation, and allies and coalition partners constitutes the resources from which Joint Force Commanders can draw upon to accomplish the engineer mission. Engineer forces are extremely adaptable and can be tailored to best meet mission requirements. Service component commanders and engineer forces are used in direct support of Service component missions. A Service component command may be delegated Tactical Control (TACON) of engineer forces from another Service in order to accomplish assigned missions or tasks. In addition, the JFC may establish support relationships between subordinate commanders to aid, protect, complement, or sustain another force.[1]

Principles of War

The nine principles of war are timeless in nature and certainly apply in aspects of joint engineer operations. Joint Publication 3-34 outlines all nine principles and uses examples of how engineers enhance these principles; it is not necessary to cover them again in this paper. However, of the nine principles one stands out that certainly is important for further discussion. Unity of Command is to ensure unity of effort under one responsible commander for every objective. This is the synergy that will make the standing Joint Engineer Headquarters so vital in supporting the JTF Commander. Unity of command means that all forces operate under a single commander with the requisite authority to

[1] Joint Publication. 2000. JP 3-34, Engineer Doctrine for Joint Operations. Washington, D.C. Government Printing Office. ppV, II-1.

direct all forces employed in pursuit of common purpose.[2] It is essential that engineer forces are working under a commander and not just a staff section in the JTF. Unity of effort requires coordination and cooperation among all forces toward a commonly recognized objective. The Joint Engineer Headquarters will be best postured to achieve unity of effort by operating at the operational and tactical nexus and understanding the strategic objectives. This can be seen in Iraq as we conduct reconstruction and restore services to communities. This effect achieves unity of effort by ensuring all projects are focused on assisting the Iraqi people. By enhancing their economy through employment, it will be possible to reduce the insurgent recruitment rate which lowers Improvise Explosive Device (IED) attacks. Unity of Command is more than just operating under one command. Instead it is the increased effect that is achieved when that one commander understands how to best employ resources to achieve strategic, operational, and tactical objectives.

Joint Engineer Strategy

The President's National Security Strategy (NSS) for 2006 stresses a policy to seek and support democratic movements and institutions in every nation and culture. The National Security Strategy is founded upon two pillars. The first is promoting freedom, justice, and human dignity – working to end tyranny, to promote effective democracies, and to extend prosperity through free and fair trade and wise development policies. The second pillar of the strategy is confronting the challenges of our time by leading a growing community of democracies.[3] An important element to fulfill and shape the goals and pillars of the NSS in the international environment is the operational effectiveness of Joint Military Engineers to conduct not only combat operations, but also

[2] Joint Publication 3-0
[3] George W. Bush. 2006. The National Security Strategy of the United States of America.

humanitarian assistance. This includes civic assistance, stability and reconstruction operations, development projects for critical infrastructure, as well as the further development of the natural resources of other countries. Military engineers have a long standing history of already being heavily engaged in these activities such as operations, Fuertos Caminos in SOUTHCOM, Mali response in the mid 80's, and recently the Tsunami and Pakistan earthquake response. They provide civic assistance, support stability and reconstruction operations, and develop projects for critical infrastructure, as well as assist in the further development of the natural resources of other countries. Military Engineers from all services provide unique capabilities in all these endeavors and are well suited as a military organization to organize and execute these missions to fulfill the NSS.

To better capitalize on these capabilities, Joint Engineers must develop a supporting strategy which organizes themselves to be increasingly flexible thus providing the full spectrum of military engineering required by the President down to the Joint Task Force Commander. Joint Military Engineering is unique in the fact that it can operate and support the strategic, operational, and tactical objectives. Unlike any other entity, Military Engineers typically support and enable both operational and sustainment functions, as well as the Diplomatic, Informational, Military, and Economic Instruments of National Power. To be more effective, the number of military engineers needs to increase, and a reorganization of engineer commands needs to be considered.

Successful Strategic Joint Engineering can be seen in Iraq today with the Gulf Region Division (GRD). The mission of the Gulf Region Division (GRD) and its components of the U.S. Army Corps of Engineers (USACE), Naval Facilities Engineer Command (NAVFAC), and Air Force Civil Engineer Support Agency (AFCESA) is to

provide quality, responsive, full spectrum engineering services in Iraq. This supports military and civil construction, logistical services, and aggressive assistance to the Iraqi Government so it can eventually assume full responsibility for national reconstruction.[4] This mission supports Chapter Three of the NSS, specifically by using national power as a way ahead to defeat global terrorism.

Joint Engineers as Shapers

Using the Joint Engineer Force in shaping the international community can be extremely effective in fighting poverty, increasing economic growth, and promoting democracy by assisting governments to better use their own countries' resources. Engineers shape the security environment by supporting the combatant commander's vision. They engage other nations by working with allies as well as potential coalition partners in engineer institutions by participating in international exercises and supporting stability operations in foreign countries. Engineers can often lead combatant commander engagement initiatives through ministry level contacts, military-to-military contact, instruction, and construction projects.[5] The JTF- Horn of Africa (HOA) engineer identified their most important mission supporting the JTF Commander as humanitarian efforts. Since JTF-HOA is primarily in Phase 0 operations, their focus is working on water resources, education, transportation, and medical projects. For example, USACE was designated by the Department of Defense (DoD) to be the Executive Agent in extinguishing the oil fires in Iraq during the 2003 invasion. USACE was able to extinguish nine oil fires during the initial operations, and has since awarded contracts

[4] USACE. 2006. USACE Website. Accessed 18 October 2006; available from http://www.usace.army.mil/; Internet.
[5] U.S. Army. 2004. FM 3-34, *Engineer Operations*. Washington, D.C.: Government Printing Office. Pg 1-16.

with just under $2 billion to sustain the oil infrastructure in Iraq which is the country's main economic resource. The National Response Plan also identifies U.S. Army Corps of Engineers as the primary agency for providing Emergency Support Function (ESF) for technical assistance, engineering, and construction management resources and support during response activities.[6]

Historic Vignettes of Strategic Joint Engineering

Joint Engineering has been involved in every major conflict from World War II to present day operations in Iraq and Afghanistan. It also assisted with Hurricane Katrina recovery efforts and is involved in Homeland Security.

World War II

During D-Day of the Normandy invasion, 6 June 1944, the Seabees were among the first to go ashore as members of naval combat demolition units. Working with U.S. Army Engineers, their crucial task was to destroy the steel and concrete barriers that the Germans had built in the water and on the beaches to forestall any amphibious landings.[7] This is an example of engineer forces of two services working together to achieve a strategic goal.

Vietnam

Based on a 1965 memo from Robert S. McNamara, Secretary of Defense, to Harold Brown, Secretary of the Air Force, a study was conducted which developed the

[6] The Department of Homeland Security. 2004. The National Response Plan.
[7] Seabee History: Formation of the Seabees and World War II. 1997; accessed 18 October 2006; available from http://www.history.navy.mil/faqs/faq67-3.htm; Internet.

Air Force's PRIME BEEF units.[8] These units worked alongside Army and Naval engineers to build or improve airfields that supported strategic bombings in North Vietnam. This resulted in decreasing the overcrowding at airfields which included bed down and maintenance facilities for aircraft and crews.

Haiti

In September 1994, the 20th Engineer Brigade from Fort Bragg, NC deployed to Haiti as a Joint Engineer Task Force (Task Force Castle). The brigade conducted a number of decisive engineer operations that supported the President's strategy and United Nations resolutions. These operations included the construction of base camps, restoration of electrical power that directly benefited the local populace, construction of a new landfill that replaced an outgrown landfill on Soleil, the refurbishment of an academy for the International Criminal Investigators Training Assistance, construction of a marketplace that supported hundreds of vendors, improvements to local schools, and garbage removal which was part of the national cleaning fervor in Haiti.[9]

Bosnia

Military Engineers played a major role in Bosnia beginning with the initial bridge construction across the Sava River which allowed 1st Armored Division forces to enter into Bosnia. The 1st Armored Division Engineer Brigade also formed a Joint Engineer Task Force that built over 24 base camps in Bosnia to support the 28,000 peacekeeping forces which supported NATO and monitored the Dayton Accord. Engineers went on to

[8] HQ AFCESACEX, RED HORSE History. 2006; accessed 18 October 2006; available from http://www.afcesa.af.mil/ceb/history/redhorse_history.asp; Internet.
[9] CPT Darren Klemens and CPT Kelly Slaven, "Task Force Castle: Joint Engineer Operations in Haiti," *Engineer*, PB5-95-1/2 (Apr 1995): 36-43

support the NATO mission by improving roads and removing explosive hazards such as mine/unexploded ordnances.

Tactical and Technical Implementation

The national strategic engineering assets of USACE, NAVFAC, and AFCESA will be vital in implementing the NSS. According to Joint Publication 3-34, USACE and NAVFACENGCOM are the Department of Defense's principal engineer organizations to plan, design, construct, and acquire (lease or buy) facilities and real estate.[10] Joint Engineering will play a vital role supporting the Department of Homeland Security and its three national priorities of preventing terrorist attacks within the U.S.; reducing America's vulnerability to terrorism; and minimizing the damage and facilitating the recovery from attacks that do occur.[11] Joint Engineers support this strategy by working with commands like Joint Task Force – North (formerly JTF-6) to prevent transnational threats to the homeland. This includes using engineer units to build roads and a fence along the Mexico-U.S. border which increases law enforcement's ability to fight the War on Drugs. It also assists law enforcement agencies by reducing illegal immigration which is a strategy outlined in Chapter Eight of the 2006 NSS under The Western hemisphere section. As a good example of how engineers are supporting the goal of reducing illegal immigration and securing US borders,

> JTF North's engineering and surveillance projects have contributed to hardening the border. Halting "alien smuggling organizations" is among its stated goals. It provides a model for the kinds of projects the National Guard will be expected to undertake as the Bush administration implements its controversial plan to strengthen the southern frontier, officials said. One such project can be found in

[10] Joint Publication. 2000. JP 3-34, Engineer Doctrine for Joint Operations. Washington, D.C.: Government Printing Office.
[11] NSS. 2006. pg 43

> the arid hills, an hour's drive east of San Diego, where active duty Marine engineers teamed with a Maryland National Guard unit to build an access road.[12]

The border security and illegal immigration issue remains a top strategic issue for the United States and Mexico, which gains economically from the current status quo. The National Guard is playing a huge role in the border security issue. The US depends on the National Guard as part of the total force concept and especially its engineer forces. Over sixty percent of the Military Engineer Force resides in the National Guard and Reserve. They will continue to be used as a strategic asset in improving the nation's borders. National Guard officials in San Diego say much is being accomplished. They point to engineers who are working on 13 construction projects, including a 17-foot secondary border fence. In the next year, they are scheduled to build 13 drainage structures and 7 miles of all-weather road in the western part of the San Diego border area; 1,000 feet of fence and three gates in the eastern portion; and 6,200 feet of fencing at Campo, about 60 miles east of San Diego.[13]

Joint Engineers bring capabilities that uniquely support the National Security Strategy along with all other elements of national power. Military Engineers are experienced at interagency support and leveraging nonmilitary and nongovernmental engineer assets to support mission accomplishment.[14] While transformation has caused the reduction in much of the engineer forces, a strategy needs to be developed to ensure these capabilities are maintained and that joint force commanders can understand the employment of those capabilities. Joint Engineers need to develop a strategy that supports the way ahead as outlined by the Administration's strategy in Chapter Four of

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[12] National Defense Online. July 2006; accessed 18 October 2006; available from http://www.nationaldefensemagazine.org/issues/2006/july/TroopsUseFrontier.htm; Internet
[13] San Francisco Chronicle. 2006. National Guard Works The Border; accessed 23 October 2006, available from https://webnet.jfsc.ndu.edu/http/0/ebird.afis.mil/ebfiles/e20061024aaindex.html; Internet
[14] U.S. Army. 2004. FM 3-34, *Engineer Operations.*1-3

the NSS. This strategy included three levels with the last being post-conflict stabilization and reconstruction. This same strategy is again focused upon in Chapter Nine in the way ahead in improving the capability to plan and respond to post conflict situations.[15] The State Department's Office of Reconstruction and Stabilization (S/CRS) is the responsible agency for integrating other US Government resources and assets, including military engineers. Therefore, Joint Engineers must continue to work closely with the Department of State in order to achieve national objectives.

The Office of Reconstruction and Stabilization (S/CRS) identifies the first of its two goals for engineers and construction as being responsive to and responding to immediate needs which is the assessment of existing facilities for post-conflict needs. The second goal is to establish the foundation for development, which include the construction of facilities to promote governance, commerce and social well being.[16] As the S/CRS continues to grow and increase, its capability will bring added value in developing policy and strategy for reconstruction efforts. The S/CRS currently has one USACE liaison assigned to its staff and will need to expand the numbers of its military members to ensure capabilities and resources are managed across the full spectrum of contingencies from civil war to natural disaster. A S/CRS representative would be a vital member in the Joint Engineer Headquarters because he/she could interface with the In Country Teams who have the understanding of what capabilities the Host Nation has for reconstruction.

Similar to how the Department of Defense is increasing the number of Special Forces operators and units, it will need to re-look at the Joint Engineer Force and increase

[15] NSS. 2006. pgs 15-16, 44-45
[16] The Department of State. 2006. Office of Reconstruction and Stabilization; accessed on 25 October 2006; available from http://www.state.gov/s/crs/; Internet

the amount of units and engineers in all the services. Like the Special Forces, engineers provide support across all six phases of an operation and are able to provide tactical, operational, and strategic engineering to the President, Combatant Commanders and JTF Commanders. The Quadrennial Defense Review (QDR) and follow-on Strategic Planning Guidance emphasized the need to continue to build on the Department's capability-based planning and management. The Joint Operational Engineer Board (JOEB) may need to look at developing a Joint Engineer Strategy as it builds the Capability Portfolio Management for Operational Engineering. In order to maximize effectiveness, a need may exist to develop an Engineer Command more like the proposed Medical Command (MEDCOM). This would be a concept similar to the proposal to develop a Medical Command combining the service medical capabilities into one command.[17] Doing so will ensure engineers will be able to significantly contribute to the achievement of national goals by overseeing and coordinating the effects of engineer forces from all services.

[17] The Navy Times. September 2006. Medical Merger. Pgs 14-15, 31.

Chapter 3

Organization

Let's examine existing doctrine and lessons learned and propose an organizational structure that best supports the JTF. The fundamental requirement of our Joint Engineer Headquarters must be under the premise that it is expeditionary in nature. It must be a headquarters that bases itself on a capabilities based force that can effectively and efficiently respond to the JTF Commander's initial requirements and then change throughout all phases of an operation. This means that the organization must be prepared to accept engineers of all services and exploit their specific expertise as required by the JTF. To see where we may fall short in the current organization, we must first explore current transformation designs of the Army Engineer Brigades and other services.

Staff Structure

Looking initially at how the typical JTF Engineer Staff is organized will help us understand and better develop the Joint Engineer Headquarters organization. The typical JTF Engineer Staff organization depicted below is comprised of a total of approximately 46 personnel, both officer and enlisted. Guidance is lacking on staff numbers, however the JFCOM Engineer, LTC Michael Darrow stated that these staff sections range anywhere from three to 80 personnel and is frequently manned from individual

augmentation.[18] The current JTF Horn of Africa Engineer Staff is lead by an O5 engineer commander for the engineering division in the Operations Directorate. He has a staff of about 14 with tactical control over 122 Seabees and 10 Army well drillers. While not an "Engineer Headquarters", this section still controls engineer activities for the Horn of Africa.

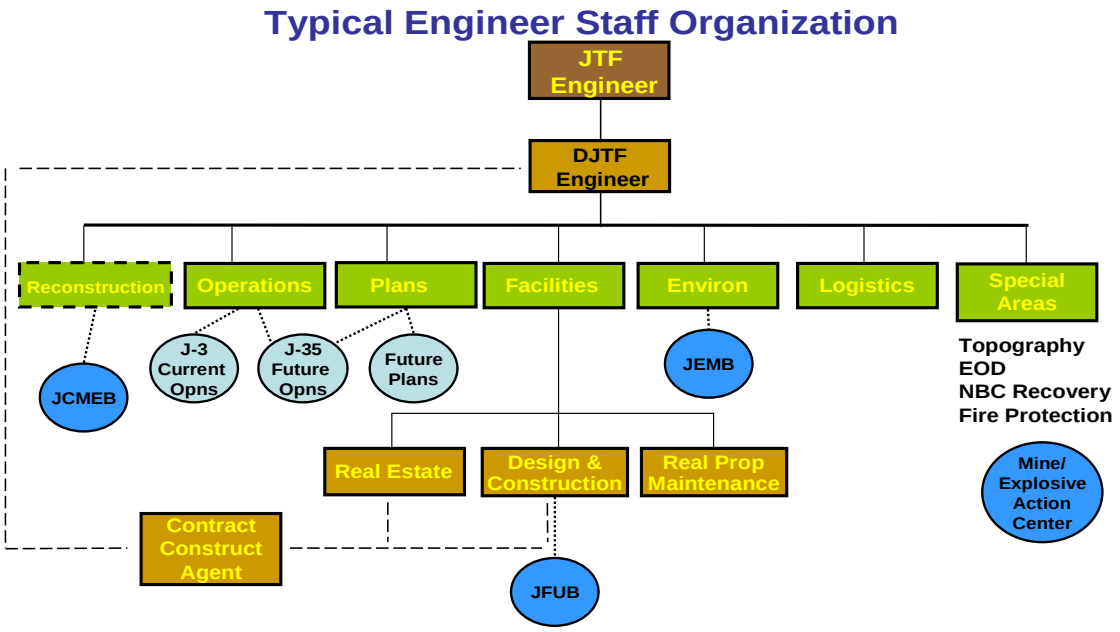

Fig. 1. Typical Joint Engineer Staff Structure.[19]

The JTF Engineer Staff is organized based on their responsibilities as outlined below.[20]

- Recommend engineer task organization & theater construction priorities.
- Prepare the Engineer Support Plan and engineer portions to other appendices.
- Plan and coordinate procurement & distribution of Class IV construction material.
- Review service component engineer plans.

[18] LTC Michael Darrow, survey conducted by author, 9 November 2006, Norfolk, VA. LTC Darrow is an Army Engineer serving as the JFCOM Engineer.
[19] JFCOM. 2006. Engineers in Joint Operations. Power Point slide presentation by the JFCOM Engineer.

[20] Ibid.

- Provide staff oversight for engineer functions, including boards as necessary.
- Balance logistical and operational engineering support.

The Joint Engineer Headquarters will not necessarily mirror this organization or have the same responsibilities as the JTF Engineer Staff. However, the Joint Engineer Headquarters must be aware of the responsibilities of the JTF Engineer Staff and how it may affect the Joint Engineer Headquarters staff.

The future modular Engineer Brigade Headquarters for the Army will be the doctrinal construct for all brigades' active duty, National Guard and Reserve. The mission statement for this future headquarters is: *Plan, integrate, and direct the execution of engineer missions conducted by 3-5 mission tailored engineer battalions to provide mobility in support of force application, focused logistics, or protection at the Joint Task Force/Army Service Component Command level. Provide the necessary level of engineer battle command to mission tailor Support Brigades or Engineer Brigades at UE. Augment Maneuver Enhancement Brigades or other Support Brigades with focused engineer battle command if engineer task organization or scope of mission requires. It may serve as a Joint Engineer HQs with augmentation. Ensure mission readiness of assigned battalion, companies, and units in the engineer force pool.*[21]

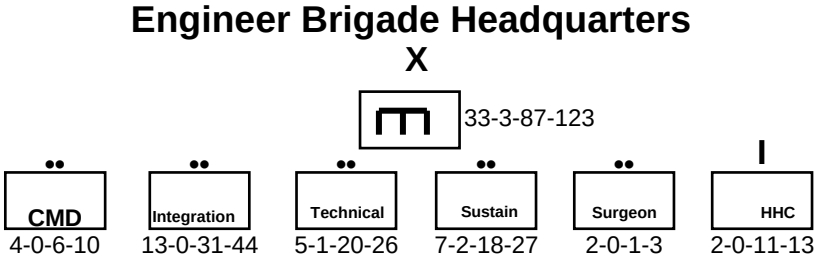

Fig. 2. Engineer Brigade Headquarters Concept.[22]

[21] U.S. Army Engineer School. 2005. Current Engineer Brigade Concept slides. Power Point brief presented by Organization Team at MANSCEN.
[22] Ibid.

In the mission statement it says that this headquarters "may serve as a Joint Engineer Headquarters." Two immediate issues with this statement are: 1) It is highly probable that this headquarters will support a JTF Headquarters and be required to command and control engineer units from all services as we have learned in Iraq and Afghanistan. 2) The mission statement identifies the requirement for augmentation. Dependence on augmentation will often leave vital positions unfilled or filled after the fact.

The JTF Engineer Staff has a robust mission that includes staff oversight of engineer forces providing for the mobility, countermobility, and survivability of combat forces. It also includes planning for engineer missions. The JTF Engineer may be responsible for chairing the Joint Civil-Military Engineering Board (JCMEB) which will establish policies, procedures, and priorities for civil-military construction. COL Robert Tipton, the Director of Common Leader Training at Fort Leonard Wood, identified the number one priority as getting engineer involvement and input throughout the planning process and during the execution process via boards and centers.[23]

With the robust mission requirements that the JTF Engineer Staff has and its dependency on augmentation of military or civilian engineers, it will rely heavily on the Joint Engineer Headquarters to command and control engineer forces. In a survey (see appendix 1 for survey questions) to senior engineer leaders, the question was posed whether the Joint Engineer Headquarters Commander should also be dual hatted as the JTF Engineer. The majority of respondents felt that it should be separate individuals of the same rank (O-6). The reasons were that this would allow effective engineer staff integration in the JTF with an engineer solely focused on all the complex operational

[23] COL Robert Tipton, survey conducted by author, 9 November 2006, Norfolk, VA. COL Tipton is the Director of Common Leader Training at Fort Leonard Wood, MO.

level engineer issues they will encounter. This allows the Joint Engineer Headquarters Commander the ability to focus on engineer command issues and conduct battlefield circulation. The commander will still play an important role along with his staff working closely with the JTF Engineer Staff and other staff sections. The one exception to this would be if the JTF Engineer is not an O-6 or higher. It may then be required for the commander to be dual hatted to have the adequate rank structure equal to other JTF staff principles. The commander will be able to use his rank and experience to effectively facilitate the engineer integration and input into planning that may not occur due to personalities and rank structure issues.

Chapter 4

Proposed Joint Engineer Headquarters

The key to this proposed Joint Engineer Headquarters structure is that this is where the true jointness of the organization takes place. The services should be most represented, not by the mere fact of making a Joint structure, but more specifically by what they bring to the engineer fight. This is where the true synergy of the Joint Engineer mission takes place.

The staffing of the organization is based on capability that can better fill a void and offer the JTF Commander a better engineer solution in a timely manner. It also meets the five criteria established in Chapter Two. One thing to remember with the proposed organization is that it can be changed and modified to better serve the JTF Commander. Like the transformation of most units it is designed to be more modular in nature. It is also based on many of the lessons learned from Iraq and Afghanistan, as well as two years as an Observer Controller at the National Training Center.

Units often stay with the status quo of their staffing structure and do not make the critical changes that would best serve their organization or the higher command. Engineer organizations must remain flexible to be better prepared for the host of engineer missions they face on the battlefield or when supporting natural disaster operations in the United States. Without the ability to remain flexible, the staff of the Joint Engineer Headquarters will not achieve the synergy necessary to provide effective results for the

JTF Commander. The below diagram shows a proposed Joint Engineer Headquarters that is structured more towards functions and capabilities rather than the simple Napoleonic staff model.

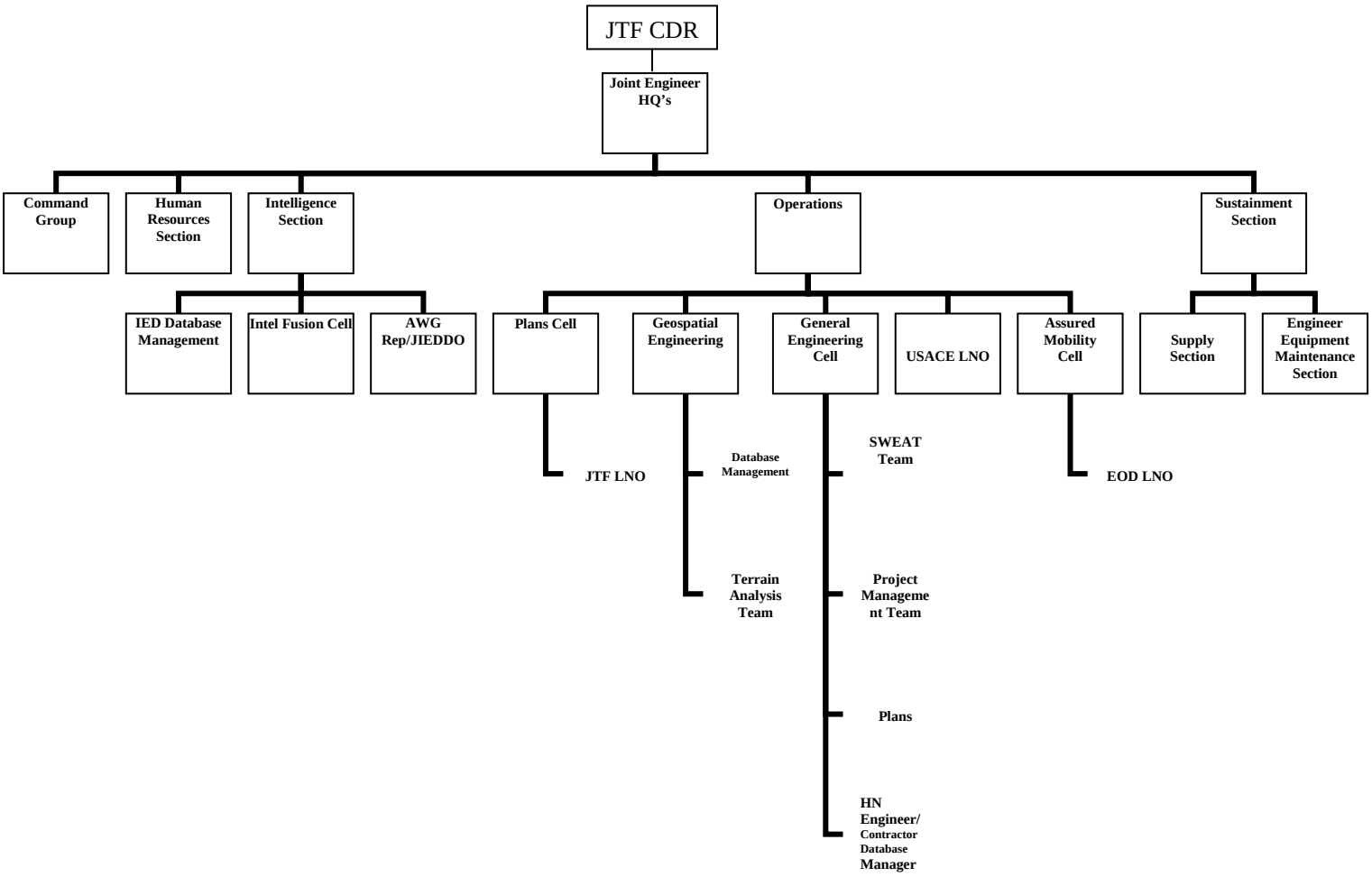

Fig. 3. Proposed Joint Engineer Headquarters.

Intelligence Section - It is important to first discuss the Intelligence Section of the Joint Engineer Headquarters. Intelligence is the driver of operations and maneuvers. This section is no less important in this headquarters than it would be in any other unit in any of the services. The U.S. Marine Corps manual on Small Wars describes the duties of the intelligence section as the primary office for the consolidation of information supplied by lower units, special agents and outside sources, and for the prompt

distribution of the resulting information to other staffs, sections, and organizations concerned. The rapid dissemination of military intelligence to all organizations concerned is fully as important as the collection of original information.[24]

The intelligence section will have a number of the traditional roles that they have always had, but will need to expand in a number of areas. One of the most important areas based on their mission statement will be as an IED database manager. This will be critical in the sharing of information on both higher and lower levels, and allow analysis of IED's along routes that may prevent JTF forces from maneuvering. The intelligence section can use any number of off the shelf software database tools to assist in this analysis. The National Training Center at Fort Irwin, California is using two tools that will enhance the capability of the intelligence section. One is the Analyst Notebook© that is a program that does linkage analysis based on time or locations. The other tool is Crystal Software, which is another database management tool. Through expertise in the Iraqi theater they have improved on this software making it compatible with Falconview software. Both of these software tools are great enhancers for database management and can be trained at the IED Center of Excellence at Fort Irwin.

Additionally, as part of the Intelligence Section, liaison officers from the Asymmetric Warfare Group and The Joint IED Defeat Organization can provide better intelligence fusion to detect asymmetric threats. As Joint ground forces take on more tasks typically associated with Special Forces and while Irregular/Asymmetric Warfare will be a primary focus in the foreseeable future, these organizations will help fuse

[24] U.S. Marine Corps. 1940. FMFRP 12-15. *Small Wars Manual.* Washington, D.C.: Government Printing Office. Pgs 24 & 32.

critical intelligence gaps that engineers may face on the battlefield. The most current example is in fighting Improved Explosive Devices in Iraq and Afghanistan which we will explore in Chapter eight.

The **Operations Section** is the conduit between the JTF Staff and subordinate engineer units. This section is the most robust section of the headquarters staff due to its requirements to work closely with the JTF staff, Interagency, and Host Nation contractors. It will also provide representation on the Joint Targeting Coordination Board, and specific engineer boards to include the Joint Facilities Utilization Board, Joint Civil-Military Engineering Board, and the Joint Environmental Management Board. In some cases the commander of the Joint Engineer Headquarters may be the chair of these engineer boards. Under the Operations Section there will be a number of cells to assist in various engineer operations such as a Plans Cell, Geospatial Cell, General Engineering Cell, USACE LNO, and an Assured Mobility Cell.

The **Plans Cell** – The planning cell is responsible for planning future engineer operations and requirements at least 96 hours in the future. Through the use of an LNO with the JTF Engineer Staff it participates in the JTF planning process to allow for both parallel and collaborative planning. This allows the Joint Engineer HQ's to maintain situational awareness on future JTF operations that may require engineer support. This cell is also responsible for preparing operation and fragmentary orders to subordinate units.

The **Geospatial Engineering Cell** – This cell is responsible for the collection, development, analysis and dissemination of terrain information. Critical to this cell are the analysis of terrain to subordinate units and the production of terrain products to support the full spectrum of engineer operations. The Database Management cell is

critical in the collection of Geospatial products. This database management function has been often neglected in the past. It must possess personnel who are trained in database management along with the ability to post terrain products in a web based format so that both units subordinate along with other units, but most importantly the JTF Commander and staff have the ability to access these products. Right now there is no clear database methodology in the Army topographic community. The Marine Corps has limited Geospatial personnel, but it has a much better Database Management System that should be adopted and improved upon for the Joint Engineer Headquarters. Another option would be to use the United States Air Force GeoBase program. GeoBase has a number of applications that could be used by the Geospatial Cell that would increase the situational awareness of the engineer force and JTF Commander and staff. In Chapter 5 the lack of interoperability will be discussed in regard to geospatial databases.

The **General Engineering Section** of the Headquarters has four components: The SWEAT Team, Project Management Team, Plans Cell, and Host Nation Engineer/Contractor Database Manager.

SWEAT Team – The acronym SWEAT will refer to Sewer, Water, Electricity (energy), Accessibility (sometimes this A is referred to as academics) and Trash (JTF-Katrina used Telecommunications for their T). Recommendation is to assign one individual responsible for each section of SWEAT, or more individuals depending on the need.

Sewage and Trash – This function covers site selection considerations, design criteria, construction methods, and operating practices for sanitary landfills and other sewage problems that may exist both among US forces occupying base camps, but also in theaters or countries where the sewage system has been neglected. It is important for

whoever has oversight of this section of the SWEAT Cell to be familiar with the laws and requirements of sewage and trash. It is important to understand the sewage and trash system in a theater of operations. As we have seen in Iraq and Afghanistan, sewage and trash can lead to contaminated drinking water and pollution caused from the burning of trash. Assigning someone with an Environmental Engineering degree or background in these areas would be ideal.

Water – Make recommendations concerning the status of water quality and possible bulk water requirements to include production, storage and quality control. Navy, Marine Corps and Air Force Engineers have organic water production and bulk storage capability while in the Army this is typically a supply function. This function may also include requirements for well drilling. Water in many places of the world is as much of a precious resource as oil. The recommendation is to assign a Navy, Marine Corps, or Air Force Engineer with the technical background in this field. It would also be possible to use Army personnel who have this experience from well drilling units or water purification units.

Electricity – This cell is responsible for supervising and making recommendations concerning electricity/power requirements and allocation of power generation assets. Additionally, it is responsible for anticipating and planning engineering requirements for power generation. This would include analysis of Host Nation power infrastructure to support US forces. Most importantly this person serves as a liaison with Engineer Power Generation and Distribution units like the Army's 249th Prime Power unit. The recommendation is to use a Non-Commissioned Officer previously assigned to a Prime Power unit.

Accessibility – The Accessibility Cell works closely with the Assured Mobility Cell (discussed below) in identifying the trafficability of roads and trails. The ability to properly maintain the Mobility Common Operating Picture (MCOP) and pass a clear route status to units throughout the battlefield is defined in Assured Mobility. Units at all levels must have freedom of movement to conduct operations. There is currently no set doctrine on how to define route status. The determination must both be fed bottom up by subordinate units traveling along routes, and then the higher level headquarters providing the status once the determination of the route is made by the staff and approved by the commander or operations officer.

During planning, engineers predict areas that the enemy may use to impede movement, using geospatial terrain products, and Intelligence, Surveillance, Reconnaissance (ISR) capabilities. Staff responsibility for the Route Status determination should not be left to the Accessibility Cell alone, but should be defined and recommended by a multitude of staff components. There are primarily two classification criteria to determine a route status. The first is the trafficability defined as the capability of terrain to bear traffic. It refers to the extent to which the terrain will permit continued movement of any or all types of traffic. The second is the threat and its ability to prevent movement along a route. The threat can be defined as the environment when looking at accessibility from a natural disaster problem. In this case roads may be impassible due to flooding or debris that prevents accessibility to assist people in need.

Project Management (PM) Cell - This cell should not only include military personnel trained in PM, but also Host Nation Engineers if at all possible. Lessons learned from Iraq identified the need to establish PM Cells such as this to ensure projects were being managed and on track. The Quality Control and Assurance can be done by

Host Nation engineers if available and trained. Additionally, this cell can work with the local populace at town meetings to let them know the status of projects in their communities.

Construction Plans Cell – This cell works with multiple agencies to develop plans for construction projects. This cell can work with other military units to develop project plans that can be executed at the tactical level. This could include soccer fields, desks for local schools, or upgrading roads. This ensures the projects that are not necessarily under the Joint Engineer Headquarters are designed well and tracked.

Host Nation Engineer/Contractor Database Manager – This is a critical function in maintaining situational awareness of engineer capabilities in a theater of operation. The host nation may have certain engineer capabilities that are specific to the local area that can assist in the reconstruction effort. This function may start prior to a deployment in developing a database of engineers and contractors that are available. This database provides the names and locations that can be tapped into to develop and work on projects. The database manager may also develop a webbed base site for contractors to bid on projects. In addition, it provides military engineers the ability to know which contractors perform to expectation and complete projects on time. This type of database can save time on bids and be passed on to other engineer or military units operating in the area.

The United States Army Corps of Engineers (USACE) LNO – USACE serves the Armed Forces and the Nation by providing vital engineering services and capabilities, as a public service, across the full spectrum of operations from peace to war in support of national interests. USACE offers a number of competencies to include water resources,

environmental, infrastructure, Homeland Security, and warfighting.[25] Their ability to get a Forward Engineer Support Team (FEST) would greatly increase the capability for engineering needs. The FEST is the USACE element that deploys to support engineer planning and USACE mission execution. FEST during OIF in Iraq brought expertise to the strategic, operational and tactical level engineer effort. They evaluated and assessed the Iraqi infrastructure systems of power, water, and oil, helping to solve field-engineering problems associated with bridging, power generation, and field sanitation.[26]

This concept integrates USACE's complimentary capabilities with deployed engineer units to provide infrastructure planning, engineering design and assessment, contract construction, real estate, and environmental engineering to meet both military and civil requirements.[27] Having an LNO in the headquarters would allow a reach back capability for answering questions regarding a number of engineering issues.

Assured Mobility Cell - Providing Assured Mobility to the JTF may be one of the most critical missions engineers are responsible for, as can be seen in Iraq and Afghanistan. It is important to discuss Assured Mobility here and how the Joint Engineer HQ plays a role in the Command and Control of this engineer function. Assured Mobility is the action that gives the force commander the ability to maneuver where and when he desires without interruption or delay to achieve the mission.[28] The framework of assured mobility entails four imperatives: 1) Developing the mobility common operating picture (MCOP). 2) Establishing and maintaining operating areas. 3) Attacking the enemy's ability to influence operating areas. 4) Maintaining mobility and

[25] USACE Website. 2006. http://www.usace.army.mil/missions/index.html
[26] Center for Army Lessons Learned. 2003. U.S. Army Engineer School. OIF Engineer Lessons Learned Initial Draft.
[27] FEST Website. 2006. http://www.saw.usace.army.mil/fest/index.htm
[28] U.S. Army. 2004. FM 3-34, *Engineer Operations*. Washington, D.C.: Government Printing Office.

momentum (see Figure 4).[29] The Joint Engineer Headquarters further develops the MCOP for the JTF-Commander by providing a refined situational awareness. This is based on engineer route reconnaissance at the tactical level along with the use of terrain data from national resources such as the National Geospatial and Intelligence Agency, or possibly the National Reconnaissance Office. The Assured Mobility Cell of the Joint Engineer Headquarters working along with the Intelligence Section can further develop the Intelligence, Surveillance, and Reconnaissance (ISR) plan to focus engineer assets on routes to increase the mobility of the JTF. The Assured Mobility and Intelligence Sections working together can better synchronize ISR platforms with route clearance and reconnaissance teams to increase situational awareness along routes, preventing Improvised Explosive Device attacks or other attacks that could hinder mobility to the JTF force.

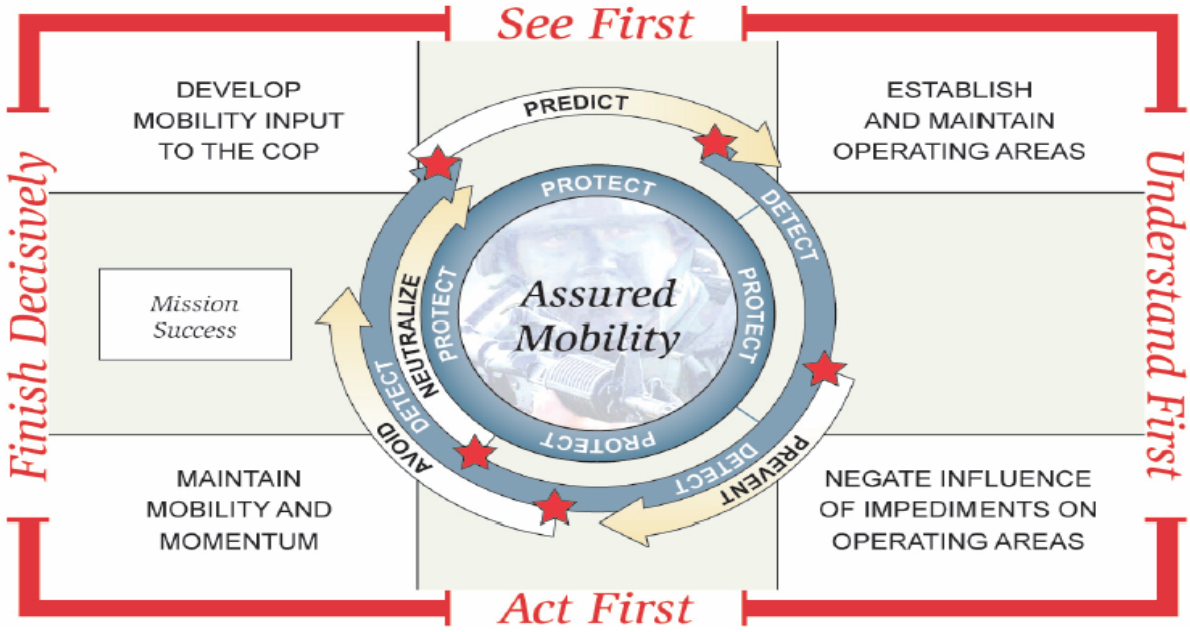

Fig. 4. Critical C4ISR linkages between process/capabilities.[30]

[29] Jeffrey A. Bedey, LTC and Ted Read, MAJ. 2003. *Engineer Magazine*. April-June 2003 issue.
[30] U.S. Army Engineer School. 2005. *An Engineer Force for the twenty first Century*. Publication date 1 October 2005. United States Army Engineer School.

As part of the Assured Mobility Cell it is also recommended assigning an Explosive Ordnance Disposal (EOD) Officer or NCO from any of the services. Based on lessons learned in Iraq and Afghanistan, Engineers and EOD must work closely together on a number of issues to include IEDs and enemy ammunition caches. An EOD LNO would be critical, acting as the interface between engineers and EOD. In Iraq and Afghanistan, engineer and EOD units have focused on developing Tactics, Techniques and Procedures (TTPs) to implement the emerging engineer doctrine of assured mobility. The 130th Engineer Brigade created an Assured Mobility Synchronization Cell (AMSC). The cell's mission focused around the six fundamentals of assured mobility while tracking and synchronizing route clearance teams, logistical convoys, maneuver operations, ISR assets, and other engineer enablers.[31]

Some of the lessons learned on assured mobility have resulted from units that were focused on the assured mobility tasks required to predict, prevent, detect, and/or neutralize obstacles. Engineers focus on mobility tasks in preparation for combat to include route marking. Units were issued various pieces of equipment as part of the effort to increase their ability to assure mobility to include the D9 Dozer, Handheld Standoff Minefield Detection System (HSTAMIDS), the Mine Lab F1A4 Mine Detector, Panther mine clearer, and TeleEngineering kits from USACE. [32]

Although these were capable systems, the units' potential was not realized due to the short training time the units had between fielding and deployment. During the campaign itself, engineers executed many missions that assured mobility to include high value asset survivability positions, terrain analysis product production, non-explosive

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[31] Schleuning, Amber, CPT. 2006. "Assured Mobility Through the Synchronization: Taking on the Counter-IED Fight." *Engineer*, Jul-Sep 2006. Pgs 17-18.
[32] Center for Army Lessons Learned. 2003. U.S. Army Engineer School. OIF Engineer Lessons Learned Initial Draft.

obstacles such as wire and berms, route reconnaissance and clearing, road craters, bridge construction, enemy explosive ordnance destruction, and mine clearing operations to name a few. Engineers were able to focus their efforts because they utilized the tenants and fundamentals of assured mobility throughout the campaign.[33]

The Joint Engineer Headquarters proposed structure is designed to better facilitate and assist in areas that the JTF Engineer Staff may not be able to focus on, and also provide a conduit in certain areas. While the proposed staff structure is extremely robust, it offers placing the best qualified person in the position that can offer a Joint perspective on solving engineer problems for both the Engineer and JTF Commander. Why it would be difficult to determine at this point the exact size of the headquarters the more important issue is how the joint billets will be filled. The headquarters would require a joint manning document and must have approval from the services to fill the required joint billets. This will most likely cause contention from the services to fill these joint billets and may require an increase in personnel end strength for the services, especially in engineer related fields.

[33] Ibid.

Chapter 5

Training and Leader Development

> It's no longer good enough to stay in your "service" lane – it's time to be better and develop applicable skills to employ everything – and everyone – that comes to the fight.
>
> - Colonel Charles Smithers, former Deputy CoS, C7 (Engineer) for Third Army and CFLCC.

Training and education of our Engineer leaders may very well be the most important task we undertake to form our Joint Engineer Headquarters. It takes commitment to send our leaders to advanced schools to become educated on Joint Engineering. Leaders will be taken away for a short period of time, and we must be willing to accept their loss, knowing we will get back a better leader who understands Joint Engineering. Schools also affect our budgets. As Colonel Smithers says in his article on Joint Engineer Training Aspects of OIF, "Leader development is the common component for engineer leaders who will lead the way as we learn and put our new joint engineer skill into practice."[34]

In 2006, the Army Maneuver Support Center at Fort Leonard Wood launched the Joint Engineer Officer Course. This course was developed from the final report of The Engineer Capabilities Study: A Path to the Future, 30 September 2002. The study identified the shortfall in Engineer Officer Education, specifically in understanding joint engineering. The study showed that most engineer officers lack an understanding in joint engineer capabilities prior to an assignment to a joint staff, and have trouble operating in a joint engineer environment.

[34] Donovan, Thomas E. COL, Charles Smithers COL, Reinhard Koenig, LTC, Steven Fuscher, C. CDR. 2004. Joint Engineer Training. *Engineer Magazine*, Jan-March 2004.

There are currently no lessons taught on Joint Engineer Doctrine at the Army Engineer Basic Course. At the Engineer Captains Career Course there is a two hour lesson titled Joint Engineer Operations. The course covers two tasks for Captains: 1) Plan Engineer Support for Joint and Combined Operations and 2) Participate in the military decision making process (MDMP) as an engineer staff officer. This same shortfall in education that hampers the joint staff will impact our staff officers and non-commissioned officers if we do not provide adequate education to fill the gap. In discussions with a former Army Engineer Brigade S3, he felt that his staff was not prepared to plan and execute joint engineer missions. He attributed this shortfall to the lack of experience his staff had and the shortage of staff officers overall. He also pointed out that his only education included the Army Command and General Staff College and two Joint Operations Courses. His brigade commander was more experienced and had served on a joint staff. Without a quality educated staff on joint engineering the headquarters brings no added value to the fight. It is expected for the staff to be well educated in joint engineering and prepared to command and control engineers from all the services. Equally important though is the staff's ability to quickly problem-solve and provide engineer solutions to the JTF Commander. These traits are optimized through both experience and education of our engineer leaders.

Additionally, the Joint Engineer Headquarters staff should train together in a way that is similar to how JFCOM provides training to a JTF Engineer Staff. This training covers three phases over about a three to four week period. The training is invaluable in bringing the staff together. The Joint Engineer headquarters would develop their training objectives which can be up to 12 months out if the headquarters is scheduled for a future deployment. JFCOM will then review the training objectives and provide a week of

academic modules to allow the staff to better support the JTF Commander. The academics can provide organizational insights to the headquarters, Engineer Planning during Crisis Action Planning, Execution of Operations, and other modules tailored to the future mission of the headquarters whether it is combat operations, Stability and Reconstruction Operations or a combination of both. The next couple of weeks would consist of planning exercises to possibly include simulations.

General Eisenhower wrote in a letter to Henry Spiese Aurand in 1945 that "regarding the integration of services, I have constantly given as one necessary objective the closer contact among officers and men beginning at a very early age. On one or two occasions I have even advocated the exchange of classes between West Point and Annapolis during the yearling and second class years. This is such a fundamental requirement that whenever I have spoken on the subject I have tried to show the mechanical integration at the top is only a start toward the objectives we are seeking."[35] If we took this same approach to Engineer officer education and allowed for exchanges at school houses and units, we would gain an engineer officer better rounded in Joint Engineering.

The future of the Joint Engineer Headquarters is based on the education of our officers and non-commissioned officers. This education will enhance the understanding of the unique capabilities that services bring to the engineer fight. To do this, leaders must understand that it will cost money and that they may lose an individual for a period of time. However, what they gain from this is an engineer leader that will be able to

[35] The Papers of Dwight David Eisenhower, Occupation, 1945: VI. Baltimore: The John Hopkins University press, 1978

employ the Joint Engineer Force much more effectively and understand the different dimensions of service parochialism.

Military engineers not only serving on joint staffs, but also those that are assigned to the Joint Engineer Headquarters should attend the resident phase of the Joint Engineer Officer Course. The course is ideally designed because it is built around JTF scenarios that allow students to better understand capabilities of all the services. This skill set will be vital in task organizing engineer forces and planning for their employment. The course is a great opportunity for engineer leaders to learn the skills they will need as a joint engineer staff officer.

Chapter 6

Materiel Solutions

The deployability of engineer equipment is inherently heavy and bulky by nature. It requires a large amount of sea and air lift. Engineers also require a large amount of logistical support for their equipment or mission requirements. The lack of interoperability of most engineer equipment among the services makes materiel solutions one of the most important aspects for the Joint Engineer Headquarters to understand. This lack of interoperability does not allow for the exchange of equipment and or the exchange of repair parts to bring equipment back to a fully mission capable status.

Materiel, whether it is engineer equipment or construction material, will be the greatest challenge to our sustainment section. This section will need a robust staff to be able to understand the differences in equipment brought to the fight by each service, specifically how that equipment will be maintained. Engineer equipment is hard to maintain at home station, but its operational readiness rate declines even more so with extended operations in various terrain and climate changes. BG Semonite in his address to the first class of students at the Joint Engineer Officer Course in July 2006 discussed the materiel problem using a number of examples.[36] His first example was with the D7 Dozer which each of the services uses as a common piece of equipment with slight modifications. This means that an Army dozer operator requiring a part could go to a Navy or Marine dozer operator and get that part if necessary. On the other hand is the Loader which differs from service to service and would not allow for the easy transfer of parts. The Headquarters Sustainment section will also need a thorough database tracking not only operational readiness rates, repair parts and their locations, but also a system to

[36] U.S. Army Engineer School. 2006. Battle Command Knowledge System. Accessed August 2006; available from https://www.mwv.army.mil/portal/eng/index.php; Internet.

track Host Nation capabilities. This would include the ability to track part vendors, and the availability to buy or lease equipment in austere locations. This has often been a challenge which has resulted in long wait times to get equipment back to a Fully Mission Capable status.

The Engineer Capabilities Study offered several recommendations to the Engineer materiel challenges. To increase the responsiveness of the Joint Engineer Force one solution offered is to preposition engineer equipment and construction material. The solution reduces the deployment time of the engineer force by not having to load heavy and bulky equipment and wait while the equipment is being moved by air or sea lift. Prepositioning equipment meets many the criteria previously mentioned in establishing our Joint Engineer Headquarters. The study also identified leasing equipment as a possible option rather than deploying equipment from home station. This option would definitely require an advanced team from the Headquarters or JTF Engineer Staff to identify and inspect the equipment prior to deployment. If not, this equipment may not be available for a number of reasons, or be available but not capable of sustained operation due to poor maintenance.

There are a couple of good news examples in the engineer equipment story. The Army and Marines have worked together on developing an Assault Vehicle Launch Bridge (AVLB) and Assault Breaching Vehicle (ABV). The Army's AVLB fleet was old and required that the bridge component be placed on a much faster and mobile chassis rather than the outdated M60 chassis that was being used. The Marines and the Army came together and developed a system that served both services and had significant cost savings. The same approach was taken with the ABV which both services were in need of. Solutions like this benefit the Joint Engineer Force. Still much work needs to be

done especially in construction of specific equipment and geospatial software and equipment. Right now each service uses a different database to produce geospatial products and analysis. A more interoperable system that jointly collects data and analyzes it would serve the engineer regiment better, and the Joint Engineer Headquarters would gain from a common interface that would share data much quicker. A common system would not only better allow the services to share data amongst each other, but also with interagency systems at the National Imagery and Mapping Agency and Defense Intelligence Agency.

The Joint Operational Engineering Board (JOEB) is an advisory group and proponent for Operational Engineering issues to the Joint Requirements Oversight Council (JROC), Joint Staff, Services, Combatant Commanders, Joint Logistics Board and other forums. It has the mission to enhance joint engineer processes and capabilities to most efficiently and effectively meet Combatant Commander operational requirements, as well as guide joint engineer force transformation and interoperability initiatives.[37] The JOEB members include the Director for Logistics, the Joint Staff (J-4 as Chair), the Logistics Director equivalents at the Combatant Commands, General Officer, Flag Officer or Senior Executive Service (GO/FO/SES) representatives of the Service Logistics Directorates, the Engineer Chiefs for the Army, Navy and Air Force, and the Marine Corps Director of Logistics Plans, Policies and Mobility Division representing Marine engineers. These members provide the senior military perspective and linkage in terms of guiding and shaping JOEB deliberations. The JOEB is a great move forward for the engineer community and will take on and solve many of the problems we face in the future with materiel and education. The JOEB has already made

[37] JOEB Charter. Jul 2005. USACE Headquarters. Pg 1

significant contributions to the Joint Engineer arena. They responded to a Combatant Commander's request for updated Airfield Damage Repair capabilities and are working to synchronize all the current and future Research and Development (R&D) efforts, TTPs, and doctrines among all the services. The JOEB also worked on Beddown Standardization across all the Services. The Army, Navy and Marines are now sharing R&D and working towards the Joint Assault Bridge and Lines of Communication (LOC) bridging. The Joint Engineer Officer Course (JEOC) was developed and implemented by the JOEB and is now being taught at Ft Leonard Wood.

Chapter 7

Engineer Functions to Support the JTF Commander

> "As engineers, we know they shape the landscape. But, they are also shaping society. They are transferring their skills to a generation of Afghans who are now learning principles of construction and construction management, to include safety that ensures what is built will last."
>
> - Lt. Gen Karl W. Eikenberry speech at the Afghanistan Engineer District Change of Command, August 2006.

Doctrine indicates that the secondary mission of the engineers is to fight as infantry. As currently seen in Iraq and Afghanistan, a large number of engineer units are being employed in this manner. The argument to this statement is why? Engineers should fight as Engineers. The engineer brings a critical capability to the JTF commander both in combat operations and Stability and Reconstruction Operations that can not be replicated by any other branch. Military engineers are always ready to respond as a combat-ready force prepared to deal with the full spectrum of potential operations. Engineer forces can be tailored to support operations in austere environments with little or no infrastructure, providing mobility and enhancing force protection through countermobility and survivability. This provides the joint forces' land, sea, and air component commander the greatest flexibility to package a force that can rapidly deploy, assist in deterring adversaries, and preclude our enemies from gaining an operational advantage in an area of operations (AO).[38] To provide the JTF Commander with the right Engineer Force to execute and complete his mission, we first must identify task/capabilities that engineers can perform for the JTF. Identifying these critical tasks is

[38] U.S. Army. 2004. FM 3-34, *Engineer Operations*. Washington, D.C.: Government Printing Office. Para 1-1.

important for the Joint Engineer Headquarters to ensure the right force package is deployed to the TOA. The US Army Engineer School has identified the following capabilities needed to support the JTF Commander.[39]

- Deploy Engineer Forces
- Plan and Control Engineer Forces
- Detect and Neutralize Explosive Hazards
- Provide Gap Crossing
- Enhance Mobility in Complex and Urban Terrain
- Attack Enemy Freedom of Maneuver
- Generate, Analyze, and Distribute Geospatial Data
- Provide Mobility Assessments
- Construct and Repair Air and Ground Lines of Communication
- Open, Establish, and Maintain Airbases
- Repair and Restore Infrastructure
- Enable Theater Access
- Enhance Force Protection
- Enhance Infrastructure Protection
- Provide Base Camp and Contingency Facility Master Planning

These capabilities are not all inclusive and can be organized under the five engineer battlespace functions of mobility, countermobility, survivability, geospatial engineering, and general engineering. Another function that should be added to the Joint Engineer Headquarters is Command and Control. This of course is the primary responsibility of the headquarters and allows it to focus on engineer mission modules based on capabilities required by the JTF Commander.

In a survey to senior engineer leaders across the services, the question was posed as to what capabilities would be most important to a JTF Commander. In some cases former brigade level commanders said that none were more important than others and that their units executed missions across the spectrum of engineer operations that included bridging and riverine operations, force protection, security engineering and

[39] U.S. Army Engineer School. 2005. *An Engineer Force for the twenty first Century.* Publication date 1 October 2005. United States Army Engineer School.

design, prime power, life support, lines of communication (LOC) construction, IED clearance, captured enemy ammunition destruction, mobility support, tactical reconstruction, and MILCON.

The question of what engineer capabilities you would consider most important to support a JTF Commander was surveyed to eight senior engineers from across all the services. The greatest response from those surveyed, was that general engineering and specifically theater wide base development should be the focus. The Marines experienced the basing issue during the initial stages of Iraqi Freedom. The limited space in Kuwait and specifically at the air bases of Al Jaber and Ali Al Salem, were primarily used for the Air Force to support beddown of personnel and equipment support during Iraqi Freedom. This forced the Marines into constructing compounds on the bases to support them.

> Third MAW set up 440 tents at Al Jaber and 400 tents and mess facilities at both sites. Seabees constructed concrete ramps at Al Jaber to accommodate the huge influx of aircraft, and additional ground preparation was made to lay AM-2 matting for additional ramp space.[40]

More and more joint forces are collocating, requiring a joint base development plan. Historically, the base development plan has fallen on the service components leaving disparity in mission support, inconsistencies in standards, and conflicts between tenant units and the host service. Basing, specifically land basing, directly affects the ability of the joint force to achieve operational reach. Effective basing allows the joint force to generate combat power in even the most austere environments and allows the joint force to be protected from enemy action whether it is from conventional forces or an asymmetric threat. The ability to program and look long term at Joint Engineering issues

[40] Nicholas E. Reynolds, *Basrah, Baghdad, and Beyond*, Naval Institute Press, 2005, pg 174.

such as base camp master planning or joint engineer resourcing of infrastructure both inside and outside the wire will remain a key task.

The amount of capability that engineers bring to the JTF Commander is great. There is probably not a single task from the list above that ranks higher than any other and it is very much situation dependant on which task would be weighted more for the JTF Commander. It also is dependent on which phase of the operation the JTF is in and what type of operation it is.

Chapter 8

Engineer Support to Counterinsurgency

> "…Today, our Nation is at war… This is a different kind of war against a different kind of enemy… War is both a physical reality and a state of mind. War is ambiguous, uncertain, and unfair. When we are at war, we must think and act differently. We become more flexible and more adaptable…"
>
> - General Peter Schoomaker, 2003, Arrival Message.

The engineer force has a wide variety of capabilities already discussed throughout this paper to support the JTF Commander in defeating an insurgency. The Engineer force supports the Army by providing combat, geospatial, and general engineering functions. The function that may have the greatest influence against an insurgency is general engineering. General engineering support may extend to assistance in the restoration of facilities, power, and life-support systems of the Host Nation. This support aids in the Host Nation's ability to provide these resources on its own and is performed by a mix of Army engineers, contractors, and Host Nation elements. The organization, training, resources available, and missions assigned are variables that will influence the effectiveness of the counterinsurgency.

In Vietnam, engineers conducted a multitude of general engineering projects. An example of one of the major projects undertaken was the massive construction of a road and bridge network that connected the major population centers of the country by modern high-speed highways. The intent of the project was to increase the effectiveness and efficiency of military re-supply, eliminate mining of the road, and assure mobility during all seasons. The additional benefit was the increase in activity of the rural population towards the cities. This increase in activity caused an increase in the South Vietnamese economy as the exchange of goods took place between the populace. The improved

quality of the people's life and the improved economy impacted the amount of influence the insurgents held on the people. This same example is seen today in the engineer support provided in Afghanistan for virtually the same reasons.

In Iraq, engineers conduct much of the same type of missions that engineers in Vietnam conducted. Various projects included restoring power grids, constructing roads and bridges, repairing sewage systems, and providing clean water. The ability to conduct these types of projects will directly influence the battle against insurgents. However, the initial phases of these projects were conducted by combat engineers, who in many cases did not possess the skills or training to accomplish these tasks. The resources and equipment were also not adequate to execute these projects effectively.

The continued success in Iraq and the defeat of the insurgency has been based on reconstruction efforts. The 8th Engineer Battalion deployed to Iraq from March 2004 to March 2005 has identified four goals as part of the rebuilding effort in Baghdad. Their goal of showing immediate progress was based on their commitment to the various tasks. As projects progressed, it showed the Iraqi people that the quality of life was improving and built confidence in the Iraqi government reducing support to the insurgency. Another goal was to provide work for Iraqis. Infrastructure projects not only created employment opportunities, stimulated the economy, but also reduced the ability of anti-Iraqi forces to recruit.[41] This is a great example of using non-lethal effects by engineers to defeat insurgency groups.

In combating insurgency engineers can also provide assets to reduce the vulnerability of attacks on friendly forces, both personnel and infrastructure. This can be

[41] Dosa, Bryan, Brian Davis, and Brad Morgan. 2005. Rebuilding Baghdad: An Engineer Battalion's Contribution. *Engineer Magazine*, April-June, pgs 11-14.

in the form of base camp construction and vulnerability assessments especially in specific areas such as entry and exit control points. This also includes the use of engineers along routes to assure mobility for logistics and other units.

The Joint Engineer Headquarters will play a critical role in assisting JTF forces in dealing with IEDs on the battlefield. IEDs have shown they are the weapon of choice for the enemy in Iraq and Afghanistan. Due to its success, it will be the threat units will face on the new asymmetric battlefield. The way the Joint Engineer Headquarters is designed will allow involvement from every staff section in the fundamentals of predict, detect, prevent, avoid, neutralize, and protect. Clear architecture and standards to share information horizontally within the headquarters is as important as the need to receive and disseminate information vertically.

The staff manages predictive analysis by gathering the right tools to develop the common operating picture. It is important to remember that this job is not done by the intelligence officer or his section alone. To defeat IEDs and the insurgency that is emplacing them, the entire staff must participate. This is done by Standardizing Common Operating Picture Standards in SOPs, either developed by the Joint Engineer Headquarters or the JTF staff. Utilizing software that is common to all units and can be accessed by all units both higher and lower is also a requirement. The IED incident overlay should be included with the COP. Patrol briefings and debriefings are critical and should be generally the same for all units. Finally working closely with EOD in developing post blast analysis reports and the dissemination of those reports that can be accessed is critical to understanding how the enemy is operating and what they are using for IED materials. This can lead to further exploitation of IED tier levels to include IED makers and financiers.

Managing these reports follows similar techniques and is highly dependent on the intelligence section and how thorough their Intelligence Preparation of the Battlefield (IPB) was. As previously discussed, ISR management will play a critical role in the detection of IEDs. The ISR overlay developed by the intelligence and operations sections must be included with the COP and shared at all levels. IED incidents and related questions must be included in the commander's priority intelligence requirements (PIR) and reinforced to subordinate units and their patrols as they operate on the asymmetric battlefield.

The Joint Engineer Headquarters may be the best unit to synchronize lethal and non-lethal effects to prevent the enemy from using IEDs against US and coalition forces or host nationals. Engineers have the ability to help in the prevention of insurgency forces from using IEDs to target convoys or large gatherings of people. The use of military engineers to rebuild infrastructure, conduct route reconnaissance, or clearance operations can be the most effective means to decrease IED incidents. In Iraq, engineers have used various means to include cleaning up trash or hiring locals to clean up trash along roadways, and removing barriers along roads that insurgents could use to emplace IEDs. They have also been employed to fill in and mark IED craters or holes so insurgents can not reuse these holes. While there is no silver bullet to defeat IEDs, the increase in technology can give engineers the leverage they need to close the gap in fighting an insurgency that uses IEDs as its predominate weapon. The intelligence section should include the latest in software analysis tools and change detection equipment. This may include IED Change Detection which is being developed by the US Army Communications – Electronics Research, Development and Engineering Center (CERDEC), to detect IEDs along travel routes using high resolution aerial/overhead

imagery. It uses day and night sights and is currently mounted on manned and unmanned aviation systems. The data is sent to a Change Detection Work Station, where a warfighter views day-to-day thermal or TV imagery that is collected by the airborne asset. This system helps an operator to identify and locate "new" environmental changes on a route which could indicate the presence of IEDs or landmines.[42]

Managing the avoidance, neutralization, and protection from IEDs will mean that the staff is required to keep the most current COP, threat template, and route status available for subordinate and higher units. It may also mean that the Joint Engineer Headquarters is responsible for an EOD unit and they are responsible for training on IED and unexploded ordinance reporting for the JTF. Working closely with units the Joint Engineer Headquarters can help in developing decision points to send out EOD assets and ensure their proper management on the battlefield.

The Joint Engineer Headquarters is best suited to be the linkage for the fundamentals of assured mobility and the JTF. While the insurgents have many capabilities within their grasp certainly they will rely heavily on IEDs in the future and it will take a headquarters that is adaptive and network enabled to defeat them. Engineers will play a critical role in the counterinsurgency fight in both its capabilities to defeat IEDs and use non-lethal means to restore infrastructure.

Engineer forces will continue to play a large role in the counterinsurgency fight especially during Phase 0 operations, as previously mentioned in JTF-HOA mission. The Joint Engineer Headquarters' planners must work closely with the JTF staff and ensure that they are used as enablers to help win the hearts and minds of the people. Engineer

[42] Defense Update. 2004. IED Change Detection, accessed 4 February 2007; available from http://www.defense-update.com/features/du-4-04/IED-Early-Warning.htm; Internet.

forces bring the right capability to do this during all phases of an operation, using both kinetic and non-kinetic capabilities.

Chapter 9

Military Engineer Support to Disaster Relief

This chapter will examine engineer support to disaster relief using some of the lessons learned from Hurricane Katrina which affected the United States Gulf Coast in August of 2005. This chapter also shows some of the lessons learned from Hurricane Andrew which affected the Florida region in August of 1992. Many of the lessons learned were re-learned during Katrina. A Joint Engineer Headquarters may have been able to better provide command and control of engineer units which have the ability to provide unique capabilities to disaster relief.

The USACE provided the Engineer Staff Cell for JTF-Katrina. According to LTG Honore in his 2006 Campaigning article, they were critical to maintaining and understanding situational awareness pertaining to sewer, water and electrical services, the pumping of waters and levee repair.[43] Using the SWEAT-M (M for Medical Emergency Services) the JTF-Katrina Engineer Cell was better able to answer CCIR by using a specific presentation as seen in figure 5 below. This type of representation is common use by staffs to offer the commander the ability to visualize where additional support is needed. The colors identify where each of the SWEAT-M categories stand for a given area (i.e. green is the best and black is the worst).

[43] Honore, LTG and COL (Ret) Barnhill. 2006. *Joint Task Force Katrina: "See First – Understand First – Act First."* Campaigning, Spring 2006.

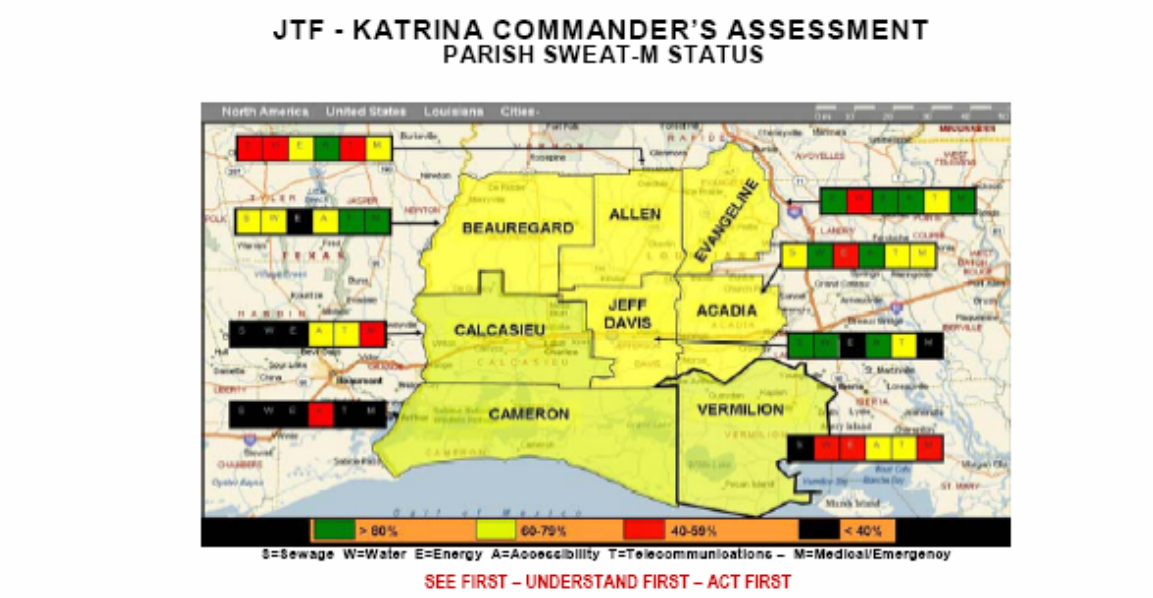

Fig. 5. JTF-Katrina Commander's Assessment Brief.[44]

Looking at the Insights and Lessons Learned submitted to the Center for Army Lessons Learned (CALL), it can be seen how well a Joint Engineer Headquarters can support an "ad hoc" JTF as it stands up to provide assistance for a natural disaster. As these lessons are reviewed, looking back at the proposed organization of the Headquarters and how it would have provided greater value added to the JTF.

The Center for Army Lessons learned identified the lack of maps and imagery as a common issue among units deployed for this type of contingency. Natural disasters often change the landscape of an area making roads and areas unidentifiable for units attempting to navigate an area. Many times units are left with only state road maps or a road atlas for reference. This is fine, but this resource may be limited to units deploying from other states as identified in the Katrina After Action Report.[45] The JTF Engineer Staff will typically have its own topographic cell. However, this cell will not be big

[44] Ibid.

[45] Center for Army Lessons learned. 2006. *Disaster Response Hurricanes Katrina and Rita.* Available from https://call2.army.mil/search/search.asp. Internet.

enough to support the amount of products required for analysis and distribution needed. The Geospatial Engineering Cell in the Joint Engineer Headquarters can not only provide the necessary topographic products for subordinate engineer units, but can also provide updated changes in roads and topography and distribute these changes through the Database Management Cell. The JTF Engineer Staff can establish distribution priorities and increase its topographic effort with the Geospatial Engineering Cell in the Joint Engineer Headquarters.

The AAR also identifies the fact that primary and alternate Lines of Communication (LOCs) were not established.[46] The Assured Mobility Cell in the proposed organization could be quickly identified to de-conflict this issue. Additional support is provided by the Accessibility Non-Commissioned officer who can prioritize route maintenance through coordination with both state and federal agencies Primary and Alternate LOCs can also be identified. The lack of visibility on engineer missions and assets was another issue found during Hurricane Katrina which could be solved by developing a Joint Engineer headquarters.

During Katrina, the Defense Coordinating Element which has its own engineer staff was established before Katrina actually hit. However, the amount of engineer units and missions being conducted was beyond the scope of the DCE Engineer Staff or JTF Engineer Staff. Neither of these staffs was capable of commanding and controlling the amount of engineer effort required. The DCE did know that there were National Guard units working recovery efforts, but were unable to develop a full situational awareness of unit assets and where they were operating. For example, the DCE did not know that

[46] Ibid.

National Guard engineers cleared and opened almost 4000 miles of roads and executed over 100 small projects.[47]

A Joint Engineer Headquarters could have properly commanded and controlled these engineers, but more importantly they could have tracked missions and reported their status to the JTF. This would have allowed better situational awareness at all levels, but would have also allowed for priorities to be set (i.e. Clear this road to allow for emergency supplies or evacuation to be conducted). The Synergy of the Joint Engineer Headquarters is the value added during these types of operations.

Many of these lessons had been previously learned during Hurricane Andrew in August 1992. During this natural disaster it was learned that response is uniquely an engineer and logistical mission. During Andrew many similar missions were conducted like those for Katrina. Engineers provided transportation to bring in food and water, opened roads, cleared debris and provided prime power for hospitals to operate. Many of the Andrew lessons learned were relearned during Katrina like developing procedures to integrate Joint Engineer Operations with local, state, and federal agencies to include USACE. A debris removal and disposal plan must be implemented to control hazardous waste and mitigate environmental impacts. There must be established engineer and infrastructure standards for an end state that will facilitate withdrawal.

Engineer forces will continue to play a tremendous role in support to disaster relief both domestically and internationally. U.S. military engineers helped to re-open

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[47] Center for Army Lessons learned. 2006. *Disaster Response Hurricanes Katrina and Rita.* Available from https://call2.army.mil/search/search.asp. Internet.

hundreds of miles of roads, permitting the flow of aid to remote communities in Pakistan during the earthquake in October 2005.

Chapter 10

Conclusion

> "The air, sea, or land power debate is over. Our collective future is irrefutably Joint. To meet the challenges of expeditionary operations, the Army can and must embrace the capabilities of its sister services right down to the tactical level."[48]

In 2005 there were approximately 21 Joint Task Force Headquarters that were activated. Six of these were permanent, four were planned capability requirements, two were known or predicted, and none were short notice, mission driven requirements. The demands upon the engineer force have always exceeded the amount of engineers that were available. Commanders at all levels will always expect and want more engineer forces. This is based on the extraordinary capability that the engineer force brings to the fight.

The degree to which the JTF Commander is responsible for full spectrum operations will require him to have a robust Standing Joint Engineer Headquarters capable of commanding and controlling engineer forces from all services. The JTF Commanders operational effectiveness will be dependent on this headquarters to be adaptable, interoperable, relevant, network enabled, and most importantly responsive. A headquarters that is dependent upon augmentation and is not prepared to provide C2 of engineer forces for the JTF Commander will offer no additional value and be unresponsive. General Peter J. Schoomaker, Chief of Staff of the Army has said "We will not be effective and relevant in the 21st century unless we become much more agile but with the capacity for a long-term, sustained level of conflict. Being relevant means having a campaign-quality Army with joint expeditionary capability. It must be an Army

[48] Brownlee and Schoonmaker, Serving a Nation at War: A Campaign Quality Army with Joint and Expeditionary Capabilities, Summer 2004, pg 11.

not trained for a single event like a track athlete, but talented across a broad spectrum like a decathlete."[49] This same idea holds true to the Joint Engineer HQ's and the command and control capabilities it brings to the fight for the JTF Commander. It must be joint which will allow the best engineer force to be used for the full spectrum of engineer operations that the JTF Commander is depending upon.

While this paper has made the argument for a Joint Engineer Headquarters and established a proposed organizational structure, it did have its opposition during the surveys of many senior engineer leaders among the services. Most respondents when asked the question, "Do you feel there is a need to establish a standing Joint Engineer Headquarters to better provide full spectrum engineering to a JTF Commander," answered, no. In all cases, many of the arguments used have been countered in this paper. For example, many responded that using augmentees would suffice to fulfill staff requirements; however, this has been illustrated as not being feasible. Some were concerned about the manpower requirement for this headquarters which has been identified as significant, but necessary to maintain the amount of situational awareness required of engineer operations. Others were concerned by the lack of command and control available with the current force structure (i.e. only four Army Engineer Brigades remaining). These points of view are important to recognize. Yet these opinions and the current engineer command and control headquarters will not support a future JTF Commander requirement as those that have been outlined in this paper.

The Joint Engineer Headquarters concept is a step to show that a more responsive and deployable C2 structure is needed. Based on current conditions in the world the engineers in the various services will need to start thinking more joint and how the

[49] Ibid.

engineer force can better serve the JTF Commander. It will be a struggle similar to the Goldwater–Nicholas Act. Once the engineer regiment decides to do this, its capability will far exceed its current operating structure.

Military engineers have been a proven force for the United States military during all if its campaigns since the Revolutionary War to the current operations today in Iraq and Afghanistan. This paper recommends some of the following actions to increase the jointness of the engineer force and its support to the JTF Commander. Make the Joint Engineer Headquarters a standing headquarters with the services providing personnel to fill billets based on expertise in a certain area. This includes having service representation in the primary staff billets (i.e. Commander, Deputy Commander, Operations Officer, and Senior Enlisted Advisor). Increase the amount of Joint Engineer training that our officers and non-commissioned officers (NCO) receive in professional military education. A program needs to be adopted to increase officer and NCO exchanges among the services to increase the knowledge base of engineers from other services. Do not dual hat the Joint Engineer Headquarters Commander as the JTF Engineer unless it must be done to ensure rank equality among the JTF Staff principles or the JTF Commander request it. It should be required that all officers and NCOs who serve on a brigade size engineer headquarters or who serve on a standing Joint Engineer Headquarters attend the Joint Engineer Officer Course at Fort Leonard Wood, MO.

Appendix 1 – Survey Questions

1. As a Brigade Level Commander or Staff Officer, was your headquarters a Joint HQ while deployed?

If yes, what other services did your headquarters command and control?

2. As a Joint Engineer Headquarters, what engineer capabilities would you consider most important to support a JTF Commander?

3. Do you feel there is a need to establish a Standing Joint Engineer Headquarters to better provide full spectrum engineering to a JTF Commander?

4. As a Brigade Commander or Staff Officer, was your staff prepared to plan and execute engineer missions as a Joint Headquarters.

5. Should the Joint Engineer Headquarters Commander also be dual hatted as the JTF Engineer, or should this remain as a separate position?

6. Other Comments.

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